CLAIMS

1. A control apparatus for an internal combustion engine which generates power by burning a mixture of fuel and air in a cylinder thereof, comprising:

in-cylinder pressure detecting means;

calculating means for calculating a control parameter based upon the in-cylinder pressure detected by the in-cylinder pressure detecting means and an in-cylinder volume at a timing of detecting the in-cylinder pressure; and

control means for setting a predetermined control quantity based upon the control parameter calculated by the calculating means.

2. The control apparatus for the internal combustion engine according to claim 1, wherein:

the control parameter includes a product of the in-cylinder pressure detected by the in-cylinder pressure detecting means and a value obtained by exponentiating the in-cylinder volume at the timing of detecting the in-cylinder pressure with a predetermined index.

3. The control apparatus for the internal combustion engine according to claim 2, wherein:

the calculating means calculates the control parameters at two predetermined points; and

the control means sets a predetermined control quantity based upon a difference in the control parameter between the two predetermined points.

4. The control apparatus for the internal combustion engine according to claim 3, wherein:

one of the two predetermined points is set as a point after the opening of an intake valve and before the combustion starting of the mixture; and

the other is set as a point after the combustion starting and before the opening of an exhaust valve.

5. The control apparatus for the internal combustion engine according to claim 3, wherein:

the control means determines a deviation between the difference in the control parameter calculated previously and the difference in the control parameter calculated at this time on a predetermined condition and sets a control quantity for correcting an air-fuel ratio of the mixture based upon the determined deviation.

6. The control apparatus for the internal combustion engine according to claim 3, wherein:

The control means sets a control quantity for correcting an air-fuel ratio of the mixture so that the difference in the control parameter is equal to a target value on a predetermined condition.

7. A control method for an internal combustion engine which generates power by burning a mixture of fuel and air, comprising the steps of:

(a) detecting an in-cylinder pressure;

(b) calculating a control parameter based upon the in-cylinder pressure detected in the step (a) and an in-cylinder volume at a timing of detecting the in-cylinder pressure; and

(c) setting a predetermined control quantity based upon the control parameter calculated in the step (b).

8. The control method for the internal combustion engine according to claim 7, wherein:

the control parameter includes a product of the in-cylinder pressure detected in the step (a) and a value obtained by exponentiating the in-cylinder volume at the timing of detecting the in-cylinder pressure with a predetermined index.

9. The control method for the internal combustion engine according to claim 8, wherein:

in the step (b), the control parameters are calculated at two predetermined points; and

in the step (c), a predetermined control quantity is set based upon a difference in the control parameter between the two predetermined points.

10. The control method for the internal combustion engine according to claim 9, wherein:

one of the two predetermined points is set as a point after the opening of an intake valve and before the combustion starting of the mixture and the other is set as a point after the combustion starting and before the opening of an exhaust valve.

11. The control method for the internal combustion engine according to claim 9, wherein:

the step (c) includes the steps of:

determining a deviation between the difference in the control parameter calculated previously and the difference in the control parameter calculated at this time on a predetermined condition; and

setting a control quantity for correcting an air-fuel ratio of the mixture based upon the determined deviation.

12. The control method for the internal combustion engine according to claim 9, wherein:

the step (c) includes the step of:

setting a control quantity for correcting an air-fuel ratio of the mixture so that the difference in the control parameter is equal to a target value on a predetermined condition.